

**BEST MANAGEMENT PRACTICES**  
*For*  
**Nutrient Management**  
*In the State of Idaho*

**ODOR CONTROL**

- Maintain a distance from the facility to any occupied residence. When considering where to place corrals, lagoon, etc., one should take into consideration the prevailing wind direction and frequency, land topography, number of animal units, the size of structure (i.e. lagoon, etc.), and manure management practices in relationship to nearby residences.
- General housekeeping around the facility, such as gathering feed spillage around feed bunks, proper carcass disposal, and keeping manure accumulation to a minimum will assist in reducing odor.
- Using inoculants (bacteria, etc.) in lagoons can reduce the amount of solid manure in the lagoon and reduce odor.
- Manure storage management – cleaning solids, settling basins, and channels on a regular basis can have a significant effect on odor.
- Through the use of aeration devices, the intensity of odor coming off of a lagoon structure can be significantly reduced. Some typical aeration devices that are being used are windmill aerators, aeration pumps, and re-circulatory systems where water is pumped from the bottom of the lagoon and injected onto the surface of the lagoon.
- Creating windbreaks through the use of structural and natural barriers around the facility can reduce the degree and distance of odor dispersal.
- Using a windbreak along the prevailing wind side of a lagoon can increase the velocity of the wind crossing the surface of the lagoon and decrease the odor through dilution.

**WASTE APPLICATION**

- Calibrate the manure spreader and apply only as much manure as the nutrient requirements of the crop. Incorporate the manure after application.
- Create buffer zones or filter strips around environmentally sensitive areas, such as rock outcroppings, surface waters, etc., to prevent surface water and groundwater contamination.
- Avoid applying waste to areas of high soil permeability with high leaching potential and areas of low soil permeability (>50% clay) since they do not provide sufficient infiltration.
- Incorporate manure after application in order to prevent runoff of the manure from occurring.
- Reduce manure applications rates near residences, roadways, etc. to decrease risk of incidental contamination and odor problems.
- Apply liquid waste at a rate that is consistent with the infiltration rate and available water holding capacity of the soil. Avoid applying liquids at a rate that will bring the soil to its maximum available water holding capacity. This will help in preventing runoff and groundwater contamination.
- Manure application to frozen ground should be limited to fields with slopes less than 6%. These minimal slopes will be less likely to have a major runoff due to a storm event.
- Manure should not be applied in a 10-yr floodplain. If manure is applied in a 10-yr floodplain area, it should be incorporated within 72 hrs of application.

## **WASTE HANDLING**

- Store, handle and mix nutrient products away from wells and other water sources. Keep manure and livestock wastes at least 200 ft away from wells to prevent problems with direct run-in.
- Berm corrals to prevent run-off of manure from the facility.
- Contain manure storage areas to prevent run-off and direct seepage to groundwater from occurring.
- When composting manure, try to maintain temperatures between 130 to 160°F through turning of windrows and the addition of moisture to achieve maximum composting capabilities.
- Continual maintenance of waste handling facilities and equipment will prevent unwarranted waste discharges into surface water and groundwater.

## **EROSION CONTROL**

- Crop residue management – Leaving residue on the soil surface reduces soil erosion and increases the soil's infiltration capabilities and available water holding capacities.
- Terraces – Graded or level terraces reduce the amount of runoff and erosion by breaking long slopes into short segments and allow the water time to infiltrate into the soil profile.
- Crop stripping, diverse rotations, and contour farming will all reduce the degree of erosion that can occur due to precipitation run-off and over irrigation.

## **NITROGEN MANAGEMENT**

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- When applying manure in the fall and winter, it is recommended that it not applied when soil temperatures are greater than 50°F. At lower temperatures, the conversion of ammonium-N to nitrate-N is significantly reduced.
- Nitrification inhibitors - Used to slow down the rate at which ammonium-N is converted into nitrate-N. They are most effective when nitrogen fertilizer is applied in the fall or early spring.
- Soil Sampling – Take representative samples of the field 3-4 weeks before planting. When taken at the rooting depth of the crop, these samples provide an accurate account of the plant available nitrogen already existing in the soil profile.
- Nitrogen Credits for Legumes and Manure – Crediting nitrogen supplied by legumes and manure can substantially reduce over application of nitrogen and fertilizer application rates.
- Irrigate fields efficiently to meet crop needs and the available water holding capacity of the soil. This will prevent the movement of nitrogen through the soil profile to groundwater caused by over irrigation.

## **PHOSPHORUS MANAGEMENT**

- Set realistic crop yield goals in order to provide an accurate account of plant phosphorus needs.
- In areas of surface water or run-off concern, berm field boundaries to prevent phosphorus from leaving the field through erosion and run-off.
- Soil Sampling – Take representative samples of the field 3-4 weeks before planting. When taken at the rooting depth of the crop, these samples provide an accurate account of the plant available phosphorus already existing in the soil profile.
- Irrigate fields efficiently to meet crop needs and the available water holding capacity of the soil. This will prevent phosphorus run-off from occurring caused by over irrigation.

## **IRRIGATION SYSTEM MANAGEMENT**

- Evaluate the irrigation system based on the available water holding capacity of the soil, crop growth stage, evapotranspiration, rainfall, and previous irrigation in order to determine the timing and amount of irrigation water to be applied.
- Irrigation systems should be operated so that they meet the crop needs, but apply less than the amount needed to saturate the soil profile.

## **FERTILIZER APPLICATION**

- Fertilizer applications should be based on scientific information. A combination of spring soil tests, realistic crop yields, and fertilizer guide recommendation data should be used to determine the appropriate amount of fertilizer that is needed.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use, split or multiply fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season till the point of major nutrient uptake.
- Fertilizer placement can often improve the efficiency of crop uptake of nutrients. Fertilizer should be applied below and with the seed planting. This will provide the crop with the needed nutrients at the beginning of root and pop-up growth.

## **SOIL SAMPLING**

- Sample soils in accordance with the *University of Idaho CES no. 704, Soil Sampling*.
- When soil samples have been collected for nitrogen testing, keep them cool and dry to prevent nitrate and ammonium concentrations from changing.
- Take separate samples from field areas that differ in soil or past management practices.
- At least 1 sample should be taken for each acre of cropland (a minimum of 15 random samples from 20 acres is the recommended sampling intensity). Then each sample for a given field should be consolidated into one composite sample.